



June 2012

U.S. Fish & Wildlife Service

Pacific Lamprey

Entosphenus tridentata



An adult Pacific lamprey Credit: Jeremy Monroe, Freshwaters Illustrated

Species Description

Lampreys belong to a primitive group of fishes that are eel-like in form but lack the jaws and paired fins of true fishes. These species have a round sucker-like mouth, no scales, and breathing holes instead of gills.

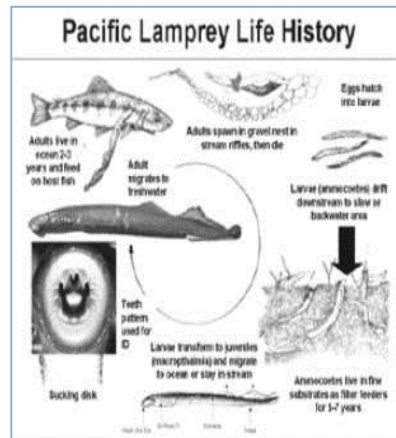
Identification of lampreys depends largely on the number, structure, and position of teeth found in adult lamprey; adult Pacific lampreys are characterized by the presence of 3 large teeth and posterior teeth on the oral disc. As larvae (ammocoetes), they are nearly indistinguishable from other lampreys.



Life History

Adult lamprey

As adults in the marine environment, Pacific lampreys are parasitic and feed on a variety of fish, including Pacific salmon, flatfish, rockfish, and pollock, and are preyed upon by sharks, sea lions, and other marine animals. They have been caught in depths ranging from 300 to 2,600 feet, and as far off the west coast as 62 miles in the ocean.



After spending 1 to 3 years in the marine environment, Pacific lampreys cease feeding and migrate to freshwater between February and June. They are thought to overwinter and remain in freshwater habitat for approximately one year before spawning where they may shrink in size up to 20 percent. Most

upstream migration takes place at night. Adult size at the time of migration ranges from about 15 to 25 inches.



A Pacific lamprey digging a redd Credit: Jeremy Monroe, Freshwaters Illustrated

Spawning

Pacific lampreys spawn in similar habitats to salmon; in gravel bottomed streams, at the upstream end of riffle habitat, typically above suitable young larvae (ammocoete) habitat.

Spawning occurs between March and July depending upon location within their range. The degree of homing is unknown, but adult lampreys cue in on ammocoete areas which release pheromones that are thought to aid adult migration and spawning location. Both sexes construct the nests, often moving stones with their mouth. After the eggs are deposited and fertilized, the adults typically die within 3 to 36 days after spawning.



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<http://www.fws.gov/pacific/Fisheries/sphabcon/Lamprey/index.cfm>

Ammocoetes (larval lamprey)

Embryos hatch in approximately 19 days at 59° Fahrenheit (F) and the ammocoetes drift downstream to areas of low velocity and fine substrates where they burrow, grow and live as filter feeders for 2 to 7 years and feed primarily on algae. Several generations and age classes of ammocoetes congregate in high densities that form colonies.



Pacific lamprey ammocoetes
Credit: USFWS

Ammocoetes are relatively immobile in the stream substrates, though will move during high flow events. Larger ammocoetes drift primarily during higher flows in spring and smaller ammocoetes drift during the summer. Anecdotal information suggests that ammocoetes may occur within the hyporheic zone and may move laterally through stream substrates.

Macrophthalmia (juvenile lamprey)



Pacific lamprey macrophthalmia
Credit: USFWS

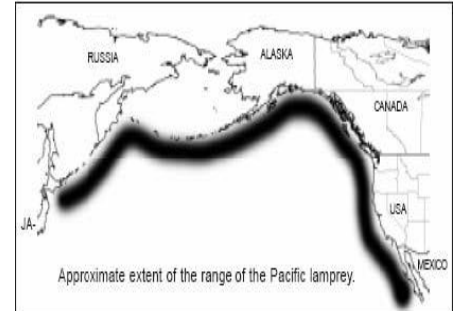
Metamorphosis to macrophthalmia (juvenile phase) occurs gradually over several months as they develop eyes, teeth, and become free swimming.

Transformation from ammocoetes to macrophthalmia typically begins in July to October. They drift and swim downstream as they emigrate to the ocean between late fall and spring where they mature into adults.

Range

Pacific lampreys are widely distributed. They have been found in streams from Hokkaido Island, Japan, and around the Pacific Rim including Alaska, Canada, Washington, Oregon, Idaho, and California to Punta Canoas, Baja California, Mexico. Their distribution includes major river systems such as the Fraser, Columbia, Klamath-Trinity, Eel, and Sacramento-San Joaquin Rivers. Historically, Pacific

lampreys are thought to be distributed wherever salmon and steelhead have occurred.



Status

Recent data indicate that distribution of the Pacific lamprey has been reduced in many river drainages. They are extirpated above dams and other impassable barriers in west coast streams, including many larger rivers throughout coastal Washington, Oregon, and California, and above dams in the upper Snake and Columbia Rivers. In addition to extirpations, Pacific lampreys have declined in abundance throughout the Columbia River basin and southern California.



In freshwater adult lamprey attach to rocks and large substrate while to hold in fast currents Credit: USFWS

Threats

Pacific lampreys face a variety of threats to its various life history stages. Taking into account the potential for lamprey utilization of an area is essential to their conservation:

- Passage (dams, culverts, water diversions, tide gates, other barriers) both upstream & downstream.



Macrophthalmia entrained at a dam intake screen Credit: U.S. Army Corps of Engineers

- Dewatering and flows (reservoir management, water diversions, construction projects).



Dead juvenile lamprey in a dewatered stream. Credit: Ralph Lampman

- Poisoning (accidental spills, chemical treatments).



This chemical spill on the Sacramento River extended over 20 miles, affecting lamprey and other aquatic species. Credit: California Department of Fish and Game

- Poor water quality.
- Dredging (channel maintenance and mining).
- Predation by nonnative fish species.



Walleye prey on adult and juvenile lamprey Credit: Hook Up Guide Service

- Stream and floodplain degradation (i.e., channelization, loss of side channel habitat, scouring).
- Ocean conditions (loss of prey, increase in predators).
- Overutilization of adult Pacific lampreys

Conservation Opportunities

Primary opportunities to protect and restore Pacific lamprey populations include:

- Provide lamprey passage
- Protect ammocoete habitat
- Restore stream channel complexity



Service biologists place large woody debris in a stream to restore aquatic habitat Credit: USFWS

For more information visit the following website:

<http://www.fws.gov/pacific/Fisheries/sphabcon/Lamprey/index.cfm>